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Abstract

Some examples of Mathematical Equations rendered in LaTex derived from Ian Stewart's, "The Seventeen Equations that Changed the World".

1 Pythagoras' Theorem

$$a^2 + b^2 = c^2$$

2 Logarithms

$$\log xy = \log x + \log y$$

3 Calculus

$$\frac{df}{dt} = \lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

4 Newton's Law of Gravity

$$F = G\frac{m_1 m_2}{d^2}$$

5 The Square Root of Minus One

$$i^2 = -1$$

6 Euler's Formula for Polyhedra

$$F - E + V = 2$$

7 The Normal Distribution

$$\Phi(x) = \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

8 The Wave Equation

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

9 The Fourier Transform

$$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{2\pi i x \xi} \quad dx$$

10 The Navier-Stokes Equation

$$\rho(\frac{\partial v}{\partial t} + v \cdot \nabla v) = -\nabla p + \nabla \cdot T + f$$

11 Maxwell's Equations

$$\nabla \cdot E = 0 \qquad \nabla \times E = -\frac{1}{c}\frac{\partial H}{\partial t}$$

$$\nabla \cdot H = 0 \qquad \nabla \times H = \frac{1}{c}\frac{\partial E}{\partial t}$$

12 The Second Law of Thermodynamics

$$dS \geq 0$$

13 Relativity

$$E = mc^2$$

14 Schrödinger's Equation

$$i\hbar\frac{\partial}{\partial t}\Psi = \hat{H}\Psi$$

15 Information Thoery

$$H = -\sum_{x} p(x) log\, p(x)$$

16 Chaos Theory

$$x_{t+1} = kx_t(1 - x_t)$$

17 Black-Scholes Equation

$$\frac{1}{2}\sigma^2 S^2\frac{\partial^2 V}{\partial S^2} + rS\frac{\partial V}{\partial S} + \frac{\partial V}{\partial t} - rV = 0$$

18 References

Ian Stewart, The Seventeen Equations that Changed the World, Profile Books, London 2013